



EJ078
Caterpillar Inc.
P.O. Box 600
Mossville, Illinois 61552

November 22, 2013

Mr. Justin Greuel
Center Director, Diesel Engine Compliance Center
U.S. Environmental Protection Agency
1310 L. Street, N.W. – 6th Floor
Washington, DC 20005

Emissions Defect Information Report

Dear Mr. Greuel:

Pursuant to 40 CFR § 1068.501, Caterpillar Inc. has determined that certain C9.3, C13, C15, and C18 engines were built with an incorrect DEF (Diesel Exhaust Fluid) diagnostic strategy in the software. The affected engines are from MY2013, engine families DCPXL09.3HTF, DCPXL12.5HTF, DCPXL15.2HTF, and DCPXL18.1HTF.

An EDIR is attached, which provides information concerning the issue and the manner in which it will be corrected.

If you have any questions or require additional information, please call.

Sincerely,

A handwritten signature in blue ink, appearing to read "Mark A. Rein".

Mark A. Rein
Manager, Emissions Conformance and Systems Development
Large Power Systems Division (MOS 11)
Caterpillar Inc.

Telephone: (309) 578-7989
Fax: (309) 578-6939
Rein_Mark_A@cat.com

cc: Erik White – ARB

EMISSIONS DEFECT INFORMATION REPORT**1) Manufacturer's corporate name and a person to contact regarding this defect:**

Caterpillar Inc.
Mark A. Rein
Manager, Emissions Conformance and Systems Development
Telephone: (309) 578-7989
Fax: (309) 578-6939
Rein_Mark_A@cat.com

2) Description of the defect, including a summary of any engineering analyses and associated data, if available:

The *Diesel Exhaust Fluid (DEF) Quality and Tampering Inducement* strategy described in our application for certification is not performing as intended. If the DEF tank level sensor has an open or short circuit, the inducement strategy initiates a three level operator warning which ends in Final Inducement of engine shutdown or idle. If a second DEF dosing system fault indicating an empty DEF tank is detected before the strategy reaches Final Inducement for the failed DEF tank level sensor, the strategy should go immediately to the third (i.e. most severe) level of operator warning, and immediately impose the Final Inducement of engine shutdown or idle.

Similarly, when a fault attributed to poor DEF quality or SCR system tampering occurs, the *DEF Quality and Tampering Inducement* strategy initiates a three level operator warning which ends in Final Inducement of engine shutdown or idle. The strategy includes a Safe Harbor mode that allows unrestricted operation of the engine for up to 20 minutes to give the operator time to move the equipment to a safe location for service. If the DEF tank becomes empty during the Safe Harbor mode, the strategy should go immediately to the third (i.e. most severe) level of operator warning, and immediately impose the Final Inducement of engine shutdown or idle.

In both cases, when an empty DEF tank is indicated--either by actual DEF level or by another dosing system fault--the *DEF Quality and Tampering Inducement* strategy is to go immediately to the third (i.e. most severe) level of operator warning. This includes horns and/or indicator lights warning the operator to immediately stop the engine. However, under some conditions the strategy may not immediately impose the Final Inducement of engine shutdown or idle but follows the original inducement strategy progression and arrives at the 3rd level of inducement in all cases in 4 hours or less.

The filing of a Defect Information Report pursuant to EPA regulations is not conclusive as to the applicability of the Production and Performance Warranties provided by Section 207(a) and 207(b) of the Clean Air Act, as amended, or Section 43204 of the California Health and Safety Code.

EMISSIONS DEFECT INFORMATION REPORT**3) Description of the engine/equipment that have the defect.**

<u>Engine Family</u>	<u>Model</u>	<u>Ratings Affected</u>	<u>Production Dates</u>
DCPXL09.3HTF	C9.3	All	27Feb2013 – 31Dec2013
DCPXL12.5HTF	C13	All	27Feb2013 – 31Dec2013
DCPXL15.2HTF	C15	All	27Feb2013 – 31Dec2013
DCPXL18.1HTF	C18	All	14Dec2012 – 31Dec2013

4i) Number and percentage of engines known or estimated to have the defect and an explanation of the means by which this number was determined:

Currently, the following numbers of engines are known to be affected by this defect based on the number of assembled engines.

<u>Model Year</u>	<u>Engine Family</u>	<u>Number of Engines</u>	<u>Defect Percentage</u>
2013	DCPXL09.3HTF	48	100%
2013	DCPXL12.5HTF	171	100%
2013	DCPXL15.2HTF	14	100%
2013	DCPXL18.1HTF	130	100%

4ii) Describe any statistical methods used to determine the number of affected engines/equipment:

No statistical methods or tools were used. Counts were based on actual build data.

5i) An estimate of the defect's impact on emissions, with an explanation of how you calculated this estimate:

The NO_x emissions impact of the affected engines was estimated using a similar methodology to AECD emission impacts which accounts for the estimated engine emissions, as well as an estimated frequency of occurrence. The estimated NO_x emissions impact using the C18 parent rating is 0.0006 tons over the useful life of the engine. This compares to a total NO_x emissions of 0.4718 tons over the useful life of the engine for the C18 parent rating as documented in Caterpillar's AECD document for the affected engine families.

The following factors were considered in the estimate of the frequency of occurrence:

- DEF tank level sensor failure rate,
- Frequency that engines are operated with a DEF level low enough that the DEF tank could become empty during the above scenarios,
- Maximum time the engine could operate without DEF before Final Inducement.

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EMISSIONS DEFECT INFORMATION REPORT

5ii) Available summary of any emissions data demonstrating the impact of the defect:

No emissions data was collected. Emissions impact is based upon engineering analysis.

6) A description of your plan for addressing the defect or an explanation of our reasons for not believing the defects must be addressed:

Caterpillar is developing new software with logic to address the incorrect DEF diagnostic strategy in the software. Cat Dealers will be notified to install the new software on all affected engines when they are serviced for any reason when it becomes available.

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